Application No. 10/646988 (Docket: CNTR.2209)
37 CFR 1.111 Amendment dated 08/22/2007
Reply to Office Action of 05/23/2007

REMARKS/ARGUMENTS

In the Office Action, the Examiner noted that claims 1-22 are pending in the application. The Examiner additionally stated that claims 1-22 are rejected. By this amendment, claims 1, 9, and 14 have been amended. Hence, claims 1-22 are pending in the application.

Applicant hereby requests further examination and reconsideration of the application, in view of the foregoing amendments.

In the Specification

Applicant has amended the specification to secure a substantial correspondence between the claims amended herein and the remainder of the specification. No new matter is presented.

In the Claims

Rejections Under 35 U.S.C. §103(a)

The Examiner rejected claims 1-22 under 35 U.S.C. 103(a) as being unpatentable over Mittal et al., U.S. Patent No. 5719800 (hereinafter, Mittal), in view of Oh, U.S. Patent No. 7069463 (hereinafter, Oh). Applicant respectfully traverses the Examiner's rejections.

With reference to claim 1, the Examiner noted that Mittal teaches the apparatus including:

- a plurality of functional units each including a corresponding plurality of activity outputs, for indicating when a respective functional unit is enabled [figs. 1 and 5]

- utilization assessment logic, coupled to said plurality of activity outputs, for assessing activity thereof to determine a current total power consumption value for the microprocessor [col. 5 lines 30-42 and col. 11 lines 54-58].

- power control logic, coupled to said utilization assessment logic, for comparing said current total power consumption value with a threshold power value included in a specified power profile [col. 5 lines 30-42 and col. 11 lines 54-58].

Page 11 of 15

Application No. 10/646988 (Docket: CNTR.2209)
37 CFR 1.111 Amendment dated 08/22/2007
Reply to Office Action of 05/23/2007

- a power consumption controller, coupled to said power management logic and said plurality of functional units, for engaging one of a plurality of power reduction modes if said current total power consumption value exceeds said threshold power value [abstract and col. 5 lines 25-29].

Applicant respectfully disagrees with the Examiner's rejection of claim 1 for the following reasons. First, Mittal teaches a technique that allows an IC to dynamically make the tradeoff between high-speed operation and low-power operation, by throttling back performance of a function unit when its recent utilization exceeds a sustainable level. Thus, the technique allows the IC to dynamically throttle back the execution rate of maximum worst-case power consumption sequences of operations so as to not exceed the worst-case power consumption allowable, thus avoiding reliability, heat dissipation, or power supply problems. (col. 4, lines 19-28) If the activity level is greater than a threshold, then a functional unit is operated in a reduced-power mode. The threshold value is set large enough to allow short bursts of high utilization to occur without impacting performance. (Abstract) Mittal states that "the validity of these or any other premises about the best techniques for optimizing performance in the context of worst-case power conservation is preferably determined by profiling the realistic worst-case power benchmark described above. (col. 12, lines 18-22). Thus, Mittal obviously teaches how to throttle performance of functional units to a level that does not exceed a worst-case power consumption value.

Applicant's invention, on the other hand, is directed toward power management of a microprocessor under more than a single circumstance. In fact, Applicant's invention is allowed to trade performance for power under certain cases. According to the present invention, more than one power profile is stored within power control logic 340 and a select signal is employed to select a specified power profile to be used. In an exemplary embodiment, power control profiles are stored in a look-up table in the power control logic 340. Each of the power profiles has a corresponding power consumption threshold. Table 5 of the specification shows 11 exemplary power profiles which may be selected from for power management.

Application No. 10/646988 (Docket: CNTR.2209)
37 CFR 1.111 Amendment dated 08/22/2007
Reply to Office Action of 05/23/2007

Accordingly, claim 1 recites, in combination with other elements and limitations:

> power control logic, coupled to said utilization assessment logic, for comparing
> said current total power consumption value with a threshold power value
> included in a specified power profile, wherein a select signal directs said
> power control logic to select said specified power profile from a plurality
> of power profiles that are stored within said power control logic.

Applicant respectfully asserts that Mittal does not teach storage of a plurality of power profiles within power control logic, nor does he teach employing a select signal to control selection of a power profile from among the plurality. Mittal teaches a mechanism for sustaining performance while managing worst-case power consumption. Furthermore, Mittal does not teach any other aspect of profiling or trading off performance for power. Mittal is entirely silent with regard to storage of multiple power profiles and selection therefrom for power management purposes. Moreover, Mittal does not suggest that his invention can be applied in any application other than worst-case power consumption management.

Regarding Oh, Applicant respectfully asserts that Oh only teaches one of the conventional methods that was used in laptop computers to conserve battery power prior, certain disadvantages of which are overcome by the present invention. That is, Oh, provides a technique for throttling the power consumed by devices that are coupled to a host bus and which are driven by a host bus clock. In particular, a CPU attached to the bus is throttled in performance by throttling its core clock, which is derived from the host bus clock. (Abstract) Oh proposes a throttle controller 220 that is coupled to the host bus 103, and which is controlled by a host clock throttler 230. The host clock throttler 230 includes a remaining battery capacity comparator 231 that compares a current remaining battery capacity to predetermined references, and a CPU load comparator 232 that compare a current load consumed by the CPU (i.e., it's current draw of current ostensibly from an external power supply) to predetermined references, and which throttles the host bus clock by enabling and disabling it (duty cycling) via a logical AND with a STP_HCLK signal having a duty cycle that is selected according to the particular

Application No. 10/646988 (Docket: CNTR.2209)
37 CFR 1.111 Amendment dated 08/22/2007
Reply to Office Action of 05/23/2007

reference crossed. Applicant respectfully asserts that such a technique is basic, indirect, and does not enable functional units within the CPU to be selectively, throttled, enabled, or disabled, based upon whether or not they are essential to operation.

Applicant has also carefully searched Oh and fails to find any teaching or suggestion that a plurality of power profiles are stored within power control logic in his CPU. In addition, Oh fails to suggest that anything can be resident within his CPU. This is because Oh teaches an indirect technique for modulating a bus clock only. Oh does not suggest, or even hint that his CPU include a select signal which directs power control logic to select one of the plurality of stored power profiles for use.

Consequently, Applicant respectfully requests that the rejection of claim 1 be withdrawn.

With respect to claims 2-8, these claims depend from claim 1 and add further limitations that are neither anticipated nor made obvious by Mittal, Oh, or Mittal and Oh in combination. Accordingly, Applicant respectfully requests that the Examiner withdraw the rejections of claims 2 and 6-8.

The Examiner also rejected claims 9 and 14 of the same basis as was set forth in the rejection of claim 1. Applicant notes that both claims 9 and 14 contain substantially similar limitations as claim 1 directed towards storage of a plurality of power profiles within power control logic resident in a microprocessor, and the employment of a select signal to control selection of one of the profiles therefrom, which have been argued above as being allowable over Mittal and Oh. Therefore, it is requested that the rejections of claims 9 and 14 be withdrawn as well.

With respect to claims 10-13, these claims depend from claim 9 and add further limitations that are neither anticipated nor made obvious by Mittal, Oh, or Mittal and Oh in combination. Accordingly, Applicant respectfully requests that the Examiner withdraw the rejections of claims 10-13.

With respect to claims 15-22, these claims depend from claim 14 and add further limitations that are neither anticipated nor made obvious by Mittal, Oh, or Mittal and Oh in combination. Accordingly, Applicant respectfully requests that the Examiner withdraw the rejections of claims 15-22.

Page 14 of 15

RECEIVED
CENTRAL FAX CENTER

AUG 2 2 2007

Application No. 10/646988 (Docket: CNTR.2209)
37 CFR 1.111 Amendment dated 08/22/2007
Reply to Office Action of 05/23/2007

CONCLUSIONS

Applicant believes this to be a complete response to all of the issues raised in the instant office action and further submits, in view of the amendments and arguments advanced above, that claims 1-22 are in condition for allowance. Reconsideration of the rejections is requested, and allowance of the claims is solicited.

Applicant also notes that any amendments made by way of this response, and the observations contained herein, are made solely for the purpose of expediting the patent application process in a manner consistent with the PTO's Patent business Goals (PBG), 65 Fed. Reg. 54603 (September 8, 2000), and are furthermore made without prejudice to Applicant under this or any other jurisdictions. It is moreover asserted that insofar as any subject matter might otherwise be regarded as having been abandoned or effectively disclaimed by virtue of amendments made herein and/or incorporated in attachments submitted with this response, Applicants wishes to reserve the right and hereby provides notice of intent to restore such subject matter and/or file a continuation application in respect thereof.

Applicant earnestly requests that the Examiner contact the undersigned practitioner by telephone if the Examiner has any questions or suggestions concerning this amendment, the application, or allowance of any claims thereof.

Respectfully submitted,
HUFFMAN PATENT GROUP, LLC

/ Richard K. Huffman /

By: _____

RICHARD K. HUFFMAN, P.E.
Registration No. 41,082
Tel: (719) 575-9998

08 / 22 / 2007

Date: _____